

**Amendment and Response**

Applicant: Alexander C. Ranous et al.

Serial No.: 09/559,693

Filed: April 27, 2000

Docket No.: 10002147-1

Title: INTERNET USAGE DATA RECORDING SYSTEM AND METHOD EMPLOYING DISTRIBUTED DATA PROCESSING AND DATA STORAGE

**IN THE CLAIMS****Amendments to the Claims**

This listing of claims will replace all prior versions, and listings, of the claims:

1. (Currently Amended) A network usage system having a multiple level distributed data storage system, the system comprising:
  - a set of first level network data collectors, wherein each first level network data collector receives network accounting data from a network data source, processes and stores the network accounting data at the first level network data collector; and
  - a second level network data collector, wherein the second level network data collector receives processed network accounting data from one or more first level network data collectors, processes and stores the network accounting data at the second level network data collector; and

wherein each first level network data collector includes a first level data storage system and the second level network data collector includes a second level data storage system, for storing processed network accounting data, wherein the first level data storage system and the second level data storage system each include a processed data storage location, a metadata storage location and an error recovery information storage location, wherein the processed network accounting data is stored at the processed data storage location.
2. (Original) The system of claim 1, further comprising a third level network data collector, wherein the third level network data collector receives processed network accounting data from the first level network data collector or the second level network data collector, processes and stores the network accounting data at the third level network data collector.

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3. (Original) The system of claim 2, further comprising an application interface which receives processed network accounting data from the first level network data collector, the second level network data collector, or the third level network data collector.
4. (Original) The system of claim 1, wherein the first level network data collector includes a query manager, and wherein the second level network data collector is in communication with the first level network data collector via the query manager.
5. (Original) The system of claim 1, wherein the first level network data collector converts the network accounting data to a standard data format.
6. (Cancelled)
7. (Cancelled)
8. (Currently Amended) The system of claim ~~7~~1, wherein after storing of the processed network accounting data, corresponding metadata is transferred to the metadata storage location and error recovery information is transferred to the error recovery information location.
9. (Currently Amended) The system of claim ~~6~~1, wherein the first level data storage system includes a first level aging policy, wherein network accounting data is removed from the first level data storage system after a time period corresponding to the first level aging policy.
10. (Original) The system of claim 9, wherein the second level data storage system includes a second level aging policy different from the first level aging policy, wherein the network accounting data is removed from the second level data storage system after a time period corresponding to the second level aging policy.

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11. (Withdrawn) A network usage system having a multiple level distributed data storage system, the system comprising:
- a first network data collector including a first encapsulator, a first aggregator, and a first data storage system;
  - a second network data collector including a second encapsulator, a second aggregator, and a second data storage system; and
  - a data correlator collector including a third encapsulator, a third aggregator, and a third data storage system, wherein the third encapsulator is in communication with the first data storage system and the second data storage system.
12. (Withdrawn) The system of claim 11, further comprising an aggregator collector including a fourth encapsulator, a fourth aggregator, and a fourth data storage system, wherein the fourth encapsulator is in communication with the third data storage system.
13. (Withdrawn) The system of claim 11, wherein the first data collector receives network data from a network data source, and wherein the first aggregator processes the network data.
14. (Withdrawn) The system of claim 13, wherein the processing of the network data includes the process of performing data reduction on the network data.
15. (Withdrawn) The system of claim 11, wherein the first data collector receives network data from a network data source, and wherein the first encapsulator converts the network data to a standard data format.
16. (Withdrawn) The system of claim 11, wherein the first aggregator processes the network data providing aggregated data, and wherein the first aggregator includes a defined data transfer interval such that the first aggregator transfers the aggregated data to the first data storage system at the data transfer interval.

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17. (Withdrawn) The system of claim 16, wherein the data correlator collector includes a defined query interval, wherein the third encapsulator queries the first data storage system for the aggregated data at the query interval.
18. (Withdrawn) The system of claim 17, wherein the data transfer interval is a multiple of the query interval.
19. (Withdrawn) The system of claim 11, wherein the first data storage system includes an aggregated data storage location, a metadata storage location and an error recovery information storage location, wherein the aggregated data is stored at the aggregated data storage location.
20. (Withdrawn) The system of claim 19, wherein after transfer of the aggregated data to the first data storage system, corresponding metadata is transferred to the metadata storage location and error recovery information is transferred to the error recovery information location.
21. (Currently Amended) A method for recording network usage including storing network data in a multiple level data storage system, the method comprising the steps of:
- defining a set of first level network data collectors;
  - receiving a first set of network accounting data at each first level network data collector,
  - processing and storing the first network accounting data set at the first level network data collector;
  - defining a second level network data collector;
  - receiving the first network accounting data set from one or more first level network data collectors, processing the first network accounting data set to produce a second network accounting data set, and storing the second network accounting data set at the second level network data collector;

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defining a first level aging policy for the first level network data collector; and removing the first network accounting data set from the first level network data collector after a time period corresponding to the first level aging policy.

22. (Original) The method of claim 21, further comprising the steps of:  
defining a third level network data collector; and  
receiving the second network accounting data set at the third level network data collector  
from the second level network data collector, processing the second network  
accounting data set to produce a third network accounting data set, and storing the  
third network accounting data set at the third level network data collector.
23. (Original) The method of claim 21, further comprising the step of defining an application  
interface; and receiving the second network accounting data set at the application interface.
24. (Original) The method of claim 21, further comprising the step of defining the first level  
network data collector to include a query manager, wherein the second level network data  
collector is in communication with the first level network data collector via the query manager.
25. (Original) The method of claim 21, wherein the step of processing and storing the first  
network accounting data set via the first level network data collector further comprises the step  
of converting the first network accounting data set to a standard data format.
26. (Original) The method of claim 21, further comprising the step of defining the first level  
network data collector to include a first level data storage system having a first processed data  
storage location, a metadata storage location and an error recovery information storage location,  
wherein the first network accounting data set is stored at the first processed data storage location.

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27. (Original) The method of claim 26, further comprising the steps of transferring metadata to the metadata storage location and transferring error recovery information to the error recovery information storage location after storing the processed first network accounting data set.

28. (Cancelled)

29. (Currently Amended) The method of claim ~~28~~21, further comprising the step of defining a second level aging policy for the second level network data collector, wherein the second level aging policy is different than the first level aging policy.

30. (Withdrawn) A network usage recording system having a multiple level distributed data storage system, the system comprising:  
a set of first level network data collectors, wherein each first level network data collector receives network usage information from a network data source, processes and stores the network usage information at the first level network data collector, including converting the network usage information to a standard data format; and  
a second level network data collector, wherein the second level network data collector receives processed network usage information converted to the standard data format, from one or more first level network data collectors, processes and stores the network usage information at the second level network data collector.

31. (Withdrawn) The system of claim 30, further comprising a third level network data collector, wherein the third level network data collector receives processed network usage information converted to the standard data format from the first level network data collector or the second level network data collector, processes and stores the network usage information at the third level network data collector.

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32. (Withdrawn) The system of claim 30, wherein the network usage information comprises at least one of network usage data or network session data, comprising at least one of a source IP address, a destination IP address, byte counts, packet counts, a time stamp and a username.
33. (Withdrawn) The system of claim 30, wherein each first level network data collector comprises an encapsulator, an aggregator, and a data storage system, and the second level data collector is a correlator collector including an encapsulator, an aggregator, and a data storage system.
34. (Withdrawn) The system of claim 33, wherein the first level encapsulator converts the network usage information to a standard data format, and the aggregator processes the converted network usage information including performing data reduction to provide aggregated data.
35. (Withdrawn) The system of claim 34, further comprising a query manager in communication with the first level network data collector and the second level network data collector; and each aggregator includes a data transfer interval such that the aggregator transfers aggregated data to the data storage system at the data transfer interval, the query manager including a query interval where the second level data collector queries the first level data storage system for the aggregated data at the query interval via the query manager.
36. (Currently Amended) A method for recording network usage including storing network data in a multiple level data storage system, the method comprising the steps of:  
defining a set of first level network data collectors;  
receiving a first set of network usage information at each first level network data collector, processing and storing the first network usage information set at the first level network data collector;  
defining a second level network data collector; and

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receiving the first network usage information set at the second level network data collector from one or more first level network data collectors, processing the first network usage information set to produce a second network usage information set, and storing the second network usage information set at the second level network data collector; and

defining the first level network data collector to include a query manager;

wherein the second level network data collector is in communication with the first level network data collector via the query manager.

37. (Previously Presented) The method of claim 21, where processing the first network usage information set includes converting the first network usage information set to a standard data format, and aggregating the converted first network usage information set.
38. (Previously Presented) The method of claim 21, where receiving the first set of network usage information includes defining the network usage information to comprise at least one of network usage data or network session data.
39. (Previously Presented) The method of claim 21, further comprising querying the first level network data collector for the processed network usage information stored at the first level network data collector; and transferring the processed network usage information to the second level network data collector.
40. (Currently Amended) A network usage system having a multiple level distributed data storage system, the system comprising:  
a set of first level network data collectors, wherein each first level network data collector receives network accounting data from a network data source, processes and stores the network accounting data at the first level network data collector, where each network data collector is configured to receive network accounting data including at least one of network



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usage data comprising source address, destination address, byte or packet counts and a time stamp, or network session data comprising a source address, a time stamp and a user name; and

a second level network data collector, wherein the second level network data collector receives processed network accounting data from one or more first level network data collectors, processes and stores the network accounting data at the second level network data collector;

wherein each first level network data collector includes a first level data storage system and the second level network data collector includes a second level data storage system, for storing processed network accounting data, wherein the first level data storage system and the second level data storage system each include a processed data storage location, a meta data storage location and an error recovery information storage location, wherein the processed network accounting data is stored at the process data storage location, wherein after storing of the process network accounting data, corresponding meta data is transferred to the meta data storage location and error recovery information is transferred to the error recovery information location;

wherein each first level network data collector includes a query manager, and wherein the second level network data collector is in communication with the first level network data collector via the query manager; and

wherein each of the first level data storage systems include a first level aging policy, wherein network accounting data is removed from the first level data storage system after a time period corresponding to the first level aging policy, and wherein the second level data storage system includes a second level aging policy different from the first level aging policy, wherein the network accounting data is removed from the second level data storage system after a time period corresponding to the second level aging policy.

41. (Previously Presented) The system of claim 40, where each first level network data collector is configured to receive network accounting data from an Internet network data source.

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42. (Previously Presented) The system of claim 40, where each first level network data collector is configured to receive network accounting data from an intranet network data source.
43. (Previously Presented) The system of claim 40, where each first level network data collector is configured to receive network accounting data from a telephony network data source.